3.2 Writing More Equations

The equations you wrote in Problem 3.1 involved only multiplication. Some equations involve two or more arithmetic operations ($+, -, \times, \div$). To write such equations, you can reason just as you do when you write one-operation equations:

Determine what the variables are.

Work out some specific numeric examples and examine them carefully. What patterns do you see? What is the role of each variable in the calculation?

Write a rule in words to describe the general pattern in the calculations.

Convert your rule to an equation with letter variables and symbols.

Think about whether your equation makes sense. Test it for a few values to see if it works.

Problem 3.2 Equations With Two Operations

When Liz tells Theo about the idea to visit Wild World, he suggests she check to see whether the park offers special prices for large groups. She finds this information on the park's Web site:

A. 1. Find the price of admission for a group of 20 people, a group of 35 people, and a group of 42 people.

2. Describe in words how you can calculate the admission price for a group with any number of people.

3. Write an equation for the admission price p for a group of n people.
4. Sketch a graph to show the admission price for a group of any size.
5. How does the pattern of change show up in the equation and graph? How is this pattern similar to the pattern in Problem 3.1? How is it different?

B. Admission to Wild World includes a bonus card with 100 points that can be spent on rides. Rides cost 6 points each.

1. Copy and complete the table below to show a customer's bonus card balance after each ride. Pay close attention to the values in the Number of Rides row.

Bonus Card Balance

Number of Rides	0	1	2	3	5	7	10	13	16
Points on Card	100								

2. Describe in words how you can calculate the number of points left after any number of rides.
3. Write an equation showing the relation between the number of rides and the points left on the bonus card. Use letters to represent the variables.
4. Sketch a graph of the data.
5. How does the pattern of change between the variables show up in the equation and graph? How is this pattern similar to the pattern in Question A? How is it different?

C. Liz wonders whether they should rent a golf cart to carry the riders' backpacks at the park. The equation $c = 20 + 5h$ shows the cost c in dollars of renting a cart for h hours:

1. Explain what information the numbers and variables in the equation represent.
2. Use the equation to make a table for the cost of renting a cart for 1, 2, 3, 4, 5, and 6 hours.
3. Make a graph of the data.
4. Describe how the pattern of change between the two variables shows up in the table, graph, and equation.

ACE **Homework starts on page 55.**